

S.O.S.



SAVE OUR SPRINGS ALLIANCE

CHIEF CLERK & OFFICE

March 3, 2006

LaDonna Castañuela
Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
P O. Box 13087
Austin, Texas 78711-3087
Fax: (512) 239-3311

OPA

MAR 06 2006

BY gr

RE: Rancho Del Lago, Inc. Permit No. WQ 0014615001

Via Facsimile, Original to Follow by U.S. Mail

Dear Ms. Castañuela,

Please accept these **comments, request for public meeting and request for contested case hearing** on the above-referenced proposed permit, requested by Rancho Del Lago, Inc. **We also ask that we receive all notices on any future actions or proposed actions concerning this proposed permit** at: Save Our Springs Alliance, attn: Sarah Baker, PO Box 684881, Austin TX 78768.

The proposed permit authorizes the Rockin' J Ranch Subdivision Wastewater Treatment Facility to treat sewage and dispose of 400,000 gallons per day of sewage effluent via surface irrigation of 100 acres of land. The wastewater treatment facilities are located within the Kentucky Branch of the Blanco River watershed. This is the drainage basin of Upper Blanco River Segment No. 1813 of the Guadalupe River Basin.

These comments are filed on behalf of Ms. Shirley Beck, 641 White Springs Ranch Rd., Blanco, TX 78606, (830) 833-4868 and Mr. Ron Harris, 301 Bent Tree Ct., Austin, TX 78746 (512) 347-0232. Ms. Beck is an adjacent landowner to the Rockin' J subdivision, identified as landowner #22 on applicant's "affected landowner's map." Ms. Beck's property abuts the most of the eastern property line of the Rockin' J. The Kentucky Branch Creek flows from the Rockin' J subdivision onto Ms. Beck's property where there is a major spring and the creek then flows back into the subdivision. Mr. Harris is an adjacent and downstream landowner identified as landowner #23 on the applicant's "affected landowner's map."

Save Our Springs Alliance

P.O. Box 684881 • Austin, Texas 78768
221 East 9th Street, Suite 300 • Austin, Texas 78701

(512) 477-2320 voice
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email: sosinfo@sosalliance.org

Attached to these comments is a letter from Mr. David Venhuizen to Ms. Sarah Baker dated March 2, 2006. Mr. Venhuizen's is professional engineer who has reviewed this permit application and provided comments on the application. Mr. Ven Huizen's letter is also submitted on Ms. Beck and Mr. Harris's behalf. Responses to these comments and Mr. Ven Huizen's should be addressed together as comments by Ms. Beck and Mr. Harris. There are many insufficiencies in the application and draft permit that cause Ms. Beck and Mr. Harris to protest this permit application.

The adjacent landowner map submitted by the applicant shows many small residential lots between the proposed golf course irrigation area and Ms. Beck's property. Recent plats filed with Blanco County, however, show a different configuration of the subdivision with the proposed golf course abutting Ms. Beck's property on the eastern edge of applicant's property line. It is difficult to determine but the recent plats may have added lots and therefore LUEs to the subdivision. If this is the case there is a question whether the proposed permit is of adequate size to treat all of the wastewater that will be collected within the subdivision. Operating the plant at higher than permitted capacities could cause major plant failure and discharge of sewage into the ground and surface water.

The applicant has filed conflicting proposals with different jurisdictions leaving the affected landowners and the TCEQ without knowledge of the definite location for the proposed irrigation fields, treatment plant site and holding pond. If the irrigation fields within the golf course will be installed in a location other than what was identified in the application new soil analysis, slope information, and vegetative analysis must be filed and analyzed.

Depending on the final location of the irrigation fields the spring on Ms. Beck's property may be within a distance less than the required 500' buffer zone. The hydrological connectivity of this spring to the irrigation area are not known, thus the increased nutrients from wastewater disposal in the watershed feeding this spring could severely pollute the spring. Additionally recent biological examination has identified a potentially unique species of salamander in the spring on Ms. Beck's property. Contamination of the spring from wastewater runoff or leaching could harm the habitat of this potentially unique and endangered salamander as well as other aquatic life. Also on Ms. Beck's property endangered golden cheek warblers have been identified. The sewer plant permit should be reviewed for effects on the habitat of the warbler. Ms. Beck maintains her rural property as a wildlife preserve and would be injured if the sewer plant and the development associated with it degraded her property as a wildlife preserve.

The permit application shows the treatment plant and holding pond abutting Ms. Beck and Mr. Harris's properties. At this location the facilities will subject Ms. Beck and Mr. Harris to nuisance odors, light and noise from the wastewater treatment facility and will injure their ability to enjoy their rural property.

The applicant proposes to develop a golf course on the irrigation fields. Irrigating wastewater on a golf course increases exponentially the pollution risks when soils are

over watered. The groundwater and surface water face significant risk of pollution from the wastewater combined with landscaping fertilizers and pesticides. The proposed permit should incorporate special provisions limiting or prohibiting additional nutrients being applied to the irrigation fields.

The calculations of wastewater irrigation evaporation and nutrient loadings appears to assume uniform application when, in reality, distribution is uneven as is uptake of water and nutrients. Irrigation is uneven due to design limitations of spray irrigation and clogging. Uptake is uneven due to slope, exposure to sunlight, depth and makeup of soil, temperature and other factors. The permit application does not provide adequate information to fully address these issues nor does it explain how these concerns will be addressed.

The maintenance equipment required to be used on the golf course can break sprinkler heads and irrigation lines causing unrestricted effluent flow over saturating the soils and running off untreated. The permit should incorporate restrictions on the weight and type of maintenance machinery that can be operated on the irrigation fields. Golf course and sewer plant personnel must be trained in the location of the effluent lines and strategies to avoid damage to the irrigation system.

The proposed irrigation system does not provide adequate monitoring for soil saturation in order to prevent irrigation in saturated conditions and runoff pollution or leaching. Adequate monitoring would include, at a minimum, soil moisture content monitors and lysimeters in each irrigation zone. The lysimeters should be monitored on a schedule to be developed according to the ratio of wastewater volume entering the treatment plant and area being irrigated at that time. The soil moisture content monitors should be tied into the plant monitoring system to automatically prevent irrigation when soil saturation is reached in any irrigation zone.

The application does not indicate that there are automatic controls or alarms for high water levels in the effluent storage tank or pump disablement. The draft permit should be modified to incorporate alarms and automatic notification for these conditions.

Under the draft permit the applicant must contract for sludge disposal at another location not owned by the permittee. Truck transportation of the sludge from the facility to the disposal location will negatively impact neighboring landowners and risks their health and safety. (See David Ven Huizen letter for estimate number of trucks necessary to dispose of sludge). Additionally there will be increased truck traffic during construction of the facility that will negatively impact Ms. Beck, Mr. Harris and other neighboring landowners.

The Kentucky Branch creek flows directly through the proposed irrigation areas. There is inadequate space soil, vegetation, and other natural features between the proposed irrigation site and the Creek to allow for proper attenuation of effluent to protect the creek from pollution. Pollution of the creek will injure the interests of downstream landowners.

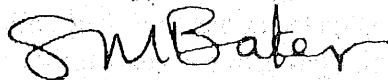
Overall the application and draft permit do not demonstrate that wastewater effluent pollution will not be discharged. The Blanco County filings indicate that if the draft permit is approved the sewage treatment plant and irrigation fields may not be constructed in the location described by the applicant and in accordance with the permit. The draft permit should not be issued until the exact and final locations for all wastewater facilities are determined.

Ms. Beck and Mr. Harris have interests not common to members of the general public. The proposed wastewater treatment facilities will impact their health and safety as well as use and enjoyment of their property, creek and spring.

This is a major wastewater treatment facility designed to serve a dense residential subdivision in a relatively rural area. The permit proposes 400,000 gallons per day of wastewater disposal in an area that does not have a comparable system to reference for performance standards. Because the proposed permit facilities would be the first of its kind in this area a public meeting on the permit should be held. There are many surrounding landowners that have a significant interest in the project and wastewater facilities.

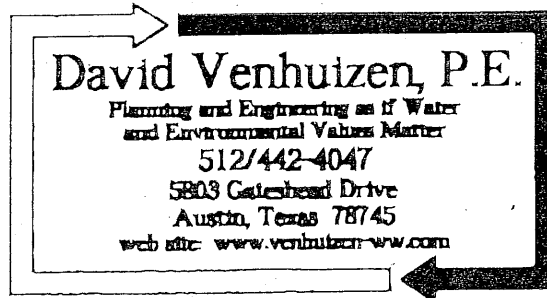
If there are any questions or comments please do not hesitate to contact me at (512) 477-2320 or sarah@sosalliance.org.

Sincerely,



Sarah M. Baker

Encl



March 2, 2006

Ms. Sarah Baker
SOS Alliance
P. O. Box 684881
Austin, Texas 78768

RE: Project ID: 06-SOS4-RDLI
Rancho del Lago wastewater permit review

Dear Ms. Baker:

As requested, I have reviewed the draft "Permit to Discharge Wastes" published by the TCEQ for the Rancho del Lago project in Blanco County, Texas. My findings are reported in this letter.

The applicant, if permitted, will be required by the terms of the permit to operate, maintain and manage the wastewater system. So it must be determined, by what means will the applicant meet those requirements, including a showing of the fiscal ability to pay for the proper completion of the requirements? This ability is called to question in light of the following:

- We see no demonstration that the applicant possesses either the technical or management expertise to execute the activities necessary to meet the requirements.
- We see no demonstration that the applicant has established a revenue stream and/or has dedicated funds to assure fiscal capability to carry out the requirements.
- Under the provisions of the draft permit, the activities to be funded and addressed include, but are not necessarily limited to:
 - Design of sampling and measurement protocols to assure that samples and measurements would be representative of actual conditions.
 - Sampling and measurements of effluent water conforming to that protocol, assuring the integrity of the samples until they reach a certified lab, and assurance of proper testing by a certified lab, including oversight of quality control.
 - Recording of results of testing and measurements to assure that proper records are created.
 - Safeguarding of all records of testing and measurements, including strip charts and records of calibration and maintenance, copies of all records required by the permit, and records of all data used to complete the application for a period of at least three years from the date of the record or sample, measurement, report or application.
 - Arrangements for management of sludge produced by the treatment process, including such sampling of sludge characteristics as may be required.
 - Records of sludge management, and safeguarding of all such records for a period of at least five years from the date the record was created.

- o Calibration of all flow measuring or recording devices and all totalizing meters for measuring flows, which shall be accurately calibrated by a trained person at plant startup and as often as necessary thereafter to ensure accuracy.
- o Operational control of a complex and inherently unstable treatment plant, including regular, periodic examination of wastewater solids within the plant in order to maintain an appropriate quantity and quality of solids inventory, activities which would require the presence of a licensed operator at least five days per week.
- o Maintenance of the collection, treatment and dispersal systems.
- o Operation of an extensive and complex irrigation system that must properly and accurately distribute water uniformly over 100 acres, including determining the times at which irrigation is not to be practiced due to the antecedent moisture conditions in the soil so as to prevent ponding of effluent or contamination of ground and surface waters and to prevent occurrence of nuisance conditions in the area, and assuring that irrigation is accomplished only when the irrigation area is not in use.
- o Assure that cover crops over the entire irrigation area are well established and maintained throughout the year for wastewater and nutrient uptake by the crop and to prevent pathways for wastewater surfacing.
- o Sampling of soils in the irrigation area, assuring the integrity of the samples until they reach a certified lab, and assurance of proper testing by a certified lab, including oversight of quality control.
- o Remittance of an annual water quality fee.
- o Make specified provisions for expansion of the treatment facilities in a timely manner.
- o Proper planning of sludge management such that 180 days notice of any change in practice can be provided to the TCEQ.

The proposed arrangements for effluent dispersal appear to be flawed and/or unsupported. While comments issued by the Water Quality Assessment Team noted the need for the applicant to characterize the soils in the dispersal area in regard to nutrient content, no requirements to demonstrate the nature and depth of soil in this area has been observed. Soils over much of the Hill Country, where this project is located, are thin and insufficient to support the sort of luxuriant growth that will be required to evapotranspire the water or to assimilate nutrients at the rates proposed to be applied. A picture included in the materials provided to me for review—which purports to show the proposed irrigation area—shows a very rocky surface with sparse plant growth. A report from the Water Quality Assessment Team states that the soil series covering the dispersal area are “very limited” (2 series) or “somewhat limited” (1 series) “to receive wastewater via irrigation” and that the soil depths in these soil series range down to zero inches. The team's report of “Agronomy Recommendations” was apparently made prior to any soil sampling information having been submitted. The soil sample analyses subsequently submitted provide no indication of the general depth of soils over the dispersal site. Thus there has been no demonstration by the applicant that the soils over the entire dispersal area are sufficient for this purpose.

It is purported that the dispersal area is to become a golf course, but at this point that golf course appears to be just a pipe dream, as there is no indication provided of a plan for the golf course or when it may be installed. It is explicitly noted in the application materials that “... the irrigation area will be on the existing vegetated area within the defined spray area, which will be over-seeded with common bermuda.” But simply over-seeding areas such as that shown in the picture referenced above is quite unlikely to result in a uniform stand of Bermuda grass—it definitely would not if soil depths were very shallow. Therefore, it seems imperative to require the applicant

to demonstrate adequate dispersal area presuming that the area remains unimproved, or alternatively to present an explicit plan for improving the soils in the area. In ALL cases, the "Soil Analysis Report" provided by the Extension Service provided a recommended application of 20, 25 or 30 lb/acre of nitrogen for a crop of "bluestem (grazing or hay)". No plans have been presented by the applicant to indicate that he is in any way prepared to grow even that crop, and it is noted that the area shown in the picture referred to above could not even be cultivated without improvement, yet the land application analysis presumes that an application rate of 40 lb/acre of nitrogen would be applied, which is purported to be supported if the crop were "turf fairways, athletic fields, etc." Again, the area in the picture referred to above could not be cropped in this manner without considerable improvement.

The land application analysis for nitrogen presumes that the level of total nitrogen in the treatment system effluent would be 10 mg/L. The level of total nitrogen typically observed in domestic wastewater is 40-60 mg/L. Available information indicates that levels tend toward the top end of that range when water-conserving fixtures are used, which legally are all that may be installed in new homes in Texas at present. Unless the treatment system is designed and operated to explicitly remove nitrogen, it should not be expected that effluent total nitrogen concentration would be much below influent concentration. There is no apparent nitrogen reduction capability in the treatment process proposed in the materials I have reviewed. Therefore, it is highly unrealistic to execute the land application analysis with a presumption that the water being dispersed has a concentration of 10 mg/L for total nitrogen. With the treatment process proposed, an effluent total nitrogen concentration of at least 40 mg/L should be presumed.

The "Nitrogen Balance" provided by the applicant in an exhibit labeled "Table 3" appears to contain errors. The application rate in January and December presumed in that table is the same as that applied in July and August; that is, it is presumed that the application rate would be "flat" throughout the year. The presumed application rate is 4,000 gallons/acre/day, which is 0.092 gallons/sq. ft./day. According to the "Monthly Water Balance" provided by the applicant in an exhibit labeled "Table 1", the evapotranspiration in January would be 1.35 inches and in December it would be 1.08 inches, which yield rates of 0.027 and 0.022 gallons/sq. ft./day, respectively. This implies that if the application rate is indeed "flat" throughout the year, the majority of the effluent applied in the winter months would leach on through the soil, otherwise it would pond and run off, which would violate the permit restrictions on system operational standards. And that in turn implies that most of the applied nitrogen would leach on through the soil rather than being taken up by the plants (noting that some would be lost to in-soil denitrification, the estimate offered in the EPA land application manual for surface irrigation of secondary effluent being about 20%). It is noted in Table 3 that the applied nitrogen is listed as an "excess" in the five months with the lowest evapotranspiration potential. In Table 1, however, it is indicated that the effluent application rate would not be "flat", that very little would be applied in January and none would be applied in December, with applications in the summer being higher, meaning the nitrogen balance analysis is fundamentally wrong. Finally, note that the calculations of applied nitrogen in Table 3 are in error.

It is suggested that the applicant should be required to provide a nitrogen analysis which represents the realities of the actual situation. This would include presuming the nitrogen uptake of the existing plant cover or the plant cover for which an explicit plan to install is offered, a presumption of at least 40 mg/L total nitrogen concentration in the system effluent, and monthly application rates that match the presumptions in the "Monthly Water Balance" calculations. In any case, the

applicant should be required to submit evidence that the proposed dispersal area has soils adequate to support plants of a quality and at a density to provide the nitrogen uptake that is presumed.

If the applicant wishes to claim that the treatment system would indeed produce an effluent that is partially denitrified effluent—that is, an effluent that has a significantly lower concentration than 40 mg/L of total nitrogen—then TCEQ should include total nitrogen in the effluent set, at the concentration claimed in the land application analysis, to assure that the presumed concentration is indeed attained on an on-going basis. If for some reason TCEQ feels that it cannot do this under its rules (in which case it should be expected TCEQ would provide a detailed explanation), TCEQ should require a detailed demonstration and justification that the treatment process proposed would be expected to consistently and reliably produce the total nitrogen concentration presumed in the land application analysis, including operating data from the exact type of treatment plant proposed. The draft permit does not include the former, and TCEQ does not appear to have required the latter. The end result is that the public is offered absolutely no assurance that nitrogen pollution would not issue from the proposed land application process.

I am informed that there is a major spring within several hundred feet of the dispersal area boundary. This would seem to imply the possibility that nitrogen leached from the dispersal area would appear in the water issuing from this spring. That may degrade the quality of surface waters. TCEQ should require the applicant to provide an explicit demonstration that nitrogen would not leach at rates above the background level of total nitrogen presently in the spring flow and/or that the water leached from the dispersal area would not feed this spring.

In regard to the monthly water balance, it is noted that the contribution of rainfall to the storage reservoir was not accounted for in the calculations in Table 1. With all units in inches, the rainfall depth should be added as an input to the reservoir in each month. This will impact on the "Storage Volume Requirements" provided by the applicant in an exhibit labeled "Table 2". Also, the storage analysis in Table 2 presumes that "flat" application rate over the annual cycle rather than the actual expected applications in each month. Evaluating the water balance and storage calculations is further complicated by there being other tables in the materials provided to me that have different values for the primary inputs. It must be determined which are the "correct" calculations, then their accuracy should be reviewed for such errors as noted here. This may impact upon the area required for dispersal and/or upon the volume of storage required. From the information available, it appears that the exhibits I have referred to in the above paragraphs are the "corrected" tables and thus the information upon which the draft permit was prepared. This would imply that TCEQ has not reviewed this information adequately, and thus TCEQ has not properly determined if the dispersal area and/or the storage reservoir are adequately sized.

In any case, the materials I have reviewed indicate that the proposed dispersal area may not all be available. The applicant states in those materials, "Spray will be limited to areas outside of any natural flow paths." As I have not seen detailed topo of the area in question, I cannot discern what impact this may have on the area that would actually be available for dispersal, but it appears that the main stem of Kentucky Branch of the Blanco River flows through the area in question. This calls to question the actual amount of area that would be available for dispersal. Further, it is noted in comments by TCEQ that areas with slopes in excess of 12% may not be used as dispersal area and that there appears to be areas with slopes >12% within the area specified by the applicant as the dispersal area. The applicant states in Domestic Worksheet 3.1 that the maximum land slope in the proposed dispersal area is 15%. Given the application rates proposed and the nature of the

dispersal area as represented by the picture referred to above, it is called to question if areas with any significant amount of slope would not produce runoff. That, of course, would be highly dependent on application rates and the irrigation cycle.

This brings up the issue of irrigation system design and operation. What is the specific hardware that would be used to execute the irrigation process? How will it be designed and controlled to provide uniform coverage and uniform daily distribution over the entire dispersal area at the proper application rates? How would those application rates be determined so that runoff or pooling would be precluded? In TCEQ comments, the only factor considered was saturated hydraulic conductivity of the soils—which itself presumed the presence of a significant depth of soil, and that has not been demonstrated. This says nothing about allowable application rates, since the ability of the soil to infiltrate is not the same as the saturated hydraulic conductivity. Further, in calculating the application rate, TCEQ presumed the annual average application rate, but since effluent would be stored during winter months and application volume would increase in the summer, the application rate would have to increase and/or the application time would have to increase. That again impacts on the required irrigation cycles, about which we have no information. Therefore, it appears that the applicant has not demonstrated that he can indeed apply the effluent to the area proposed for dispersal without causing runoff or pooling of effluent.

In sum, while what appears to be a comment by TCEQ states, "The water balance prepared by TCEQ staff confirms that an effluent application rate of 4.48 acre-feet per year per acre irrigated is possible at the proposed site and the storage calculations confirm that 110 days of storage is adequate for the proposed facility", I cannot discern from the material I have been able to review that this is indeed the case. The questions noted above must be addressed and appropriate analyses conducted before this can be determined.

Regarding sludge management, the analysis provided by the applicant states that, at full design flow, 1,598 gallons of sludge would be produced per day and that sludge would be removed at 63-day intervals, implying that the total amount of sludge hauled at each removal would be $63 \times 1598 = 100,674$ gallons. A 7,000-gallon truck is typically used by companies that haul sludge from plants like the one proposed, implying that each removal would entail $100,674/7,000 = 14.4$ truckloads. That means that the contents of the sludge digester would be "disturbed" 15 times during each removal event. This implies a significant odor potential. There is nothing apparent in the material provided by the applicant that describes how odors would be controlled and a nuisance would be prevented, a nuisance that would occur about once every two months at full design flow. This is anything but a trivial problem. It is called to question how the sludge management process would be managed so as to preclude the problem.

There is no discussion provided on the nature of the collection system, and the consequent level of vulnerability that it represents. Conventional collection mains WILL leak, manholes WILL overflow, lift stations WILL fail. This raises the following questions:

- What are the design features of the system that may minimize any of this?
- What is the level of management that would be applied to minimize any of this?
- What analysis of these vulnerabilities has been conducted, and what did this imply for the overall ability of the system to perform "as advertised"?

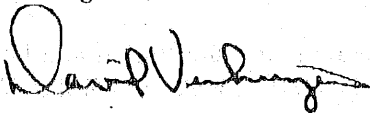
The application clearly defines the function of the dispersal system to be "disposal", which implies that the point of the management system is to control a nuisance rather than to manage a resource. While it is purported that the dispersal area would eventually be a golf course, the irrigation of which could be considered a beneficial reuse, there is no indication that this would actually happen. It is suggested that TCEQ can only judge this application on the basis of what is apparent that **WILL** happen, and in this case, what will happen is that the effluent would be "land-dumped" for the sole purpose of getting rid of something that is perceived to be a nuisance. The proposed system would waste up to 146 million gallons of water per year. Given the long-term water supply realities of the region, it would seem that TCEQ has an interest in having the applicant consider alternative systems that would more effectively conserve a valuable natural resource, rather than treat it as a nuisance to be disposed of.

I also have questions about the ability of the proposed treatment process to operate so as to consistently and reliably produce any given level of effluent in the face of diurnal flow variations and during the period when considerably less than full design flow is being received. However, the materials that I have reviewed do not provide enough details on the process to formulate specific questions. There is no operating theory for activated sludge that does not assume steady state flow. Since this system would not receive steady state flow, there is no theoretical basis for expecting any specific level of performance. Understand that the TCEQ design standards are predicated essentially on "static" performance, and many, many plants that are designed to those standards have exhibited very poor performance in the field when operating under real-world conditions. Therefore, any realistic consideration of the level of hazard represented by such a plant, even if competently operated (which in this case is open to question as the applicant has demonstrated no capability to manage this proposed wastewater system), must examine actual operating experience of *this* proposed process under similar duty to which it would be subjected in this case. I would suggest that the applicant should be required to submit such operating history.

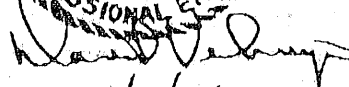
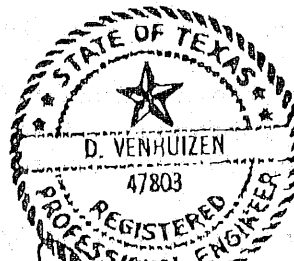
Finally, the applicant does not have a wastewater CCN for the area to be served by the proposed system. According to information provided by TCEQ, the application for a "sewer CCN" is contested and has been in process for an unusually long time, which implies that there is no assurance that a CCN can be obtained. Unless that CCN is "awarded" to Rancho del Lago, Inc., this entire permit application is moot.

Please do not hesitate to call if you have any questions about any aspect of these observations and comments.

Best regards,



David Venhuizen, P.E.



3/2/06

S.O.S.



SAVE OUR SPRINGS ALLIANCE

March 3, 2006

LaDonna Castañuela
Office of the Chief Clerk, MC 105
Texas Commission on Environmental Quality
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MWD
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MAR 07 2006 PM
BY gr

CHIEF CLERK'S OFFICE

MAR 07 - 6 PM 3:35

COMPLAINT
ON ENVIRONMENTAL
QUALITY

RE: Rancho Del Lago, Inc. Permit No. WQ 0014615001

Via Facsimile, Original to Follow by U.S. Mail

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The calculations of wastewater irrigation evaporation and nutrient loadings appears to assume uniform application when, in reality, distribution is uneven as is uptake of water and nutrients. Irrigation is uneven due to design limitations of spray irrigation and clogging. Uptake is uneven due to slope, exposure to sunlight, depth and makeup of soil, temperature and other factors. The permit application does not provide adequate information to fully address these issues nor does it explain how these concerns will be addressed.

The maintenance equipment required to be used on the golf course can break sprinkler heads and irrigation lines causing unrestricted effluent flow over saturating the soils and running off untreated. The permit should incorporate restrictions on the weight and type of maintenance machinery that can be operated on the irrigation fields. Golf course and sewer plant personnel must be trained in the location of the effluent lines and strategies to avoid damage to the irrigation system.

The proposed irrigation system does not provide adequate monitoring for soil saturation in order to prevent irrigation in saturated conditions and runoff pollution or leaching. Adequate monitoring would include, at a minimum, soil moisture content monitors and lysimeters in each irrigation zone. The lysimeters should be monitored on a schedule to be developed according to the ratio of wastewater volume entering the treatment plant and area being irrigated at that time. The soil moisture content monitors should be tied into the plant monitoring system to automatically prevent irrigation when soil saturation is reached in any irrigation zone.

The application does not indicate that there are automatic controls or alarms for high water levels in the effluent storage tank or pump disablement. The draft permit should be modified to incorporate alarms and automatic notification for these conditions.

Under the draft permit the applicant must contract for sludge disposal at another location not owned by the permittee. Truck transportation of the sludge from the facility to the disposal location will negatively impact neighboring landowners and risks their health and safety. (See David Ven Huizen letter for estimate number of trucks necessary to dispose of sludge). Additionally there will be increased truck traffic during construction of the facility that will negatively impact Ms. Beck, Mr. Harris and other neighboring landowners.

The Kentucky Branch creek flows directly through the proposed irrigation areas. There is inadequate space soil, vegetation, and other natural features between the proposed irrigation site and the Creek to allow for proper attenuation of effluent to protect the creek from pollution. Pollution of the creek will injure the interests of downstream landowners.

Overall the application and draft permit do not demonstrate that wastewater effluent pollution will not be discharged. The Blanco County filings indicate that if the draft permit is approved the sewage treatment plant and irrigation fields may not be constructed in the location described by the applicant and in accordance with the permit. The draft permit should not be issued until the exact and final locations for all wastewater facilities are determined.

Ms. Beck and Mr. Harris have interests not common to members of the general public. The proposed wastewater treatment facilities will impact their health and safety as well as use and enjoyment of their property, creek and spring.

This is a major wastewater treatment facility designed to serve a dense residential subdivision in a relatively rural area. The permit proposes 400,000 gallons per day of wastewater disposal in an area that does not have a comparable system to reference for performance standards. Because the proposed permit facilities would be the first of its kind in this area a public meeting on the permit should be held. There are many surrounding landowners that have a significant interest in the project and wastewater facilities.

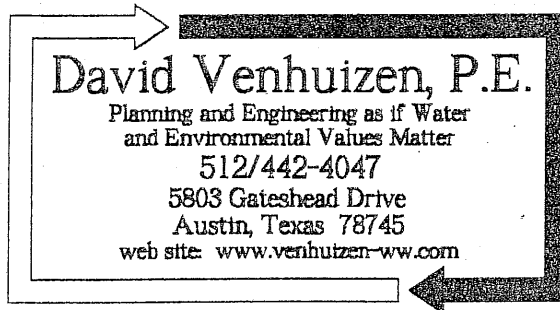
If there are any questions or comments please do not hesitate to contact me at (512) 477-2320 or sarah@sosalliance.org.

Sincerely,



Sarah M. Baker

Encl.



March 2, 2006

Ms. Sarah Baker
SOS Alliance
P. O. Box 684881
Austin, Texas 78768

RE: Project ID: 06-SOS4-RDLI
Rancho del Lago wastewater permit review

Dear Ms. Baker:

As requested, I have reviewed the draft "Permit to Discharge Wastes" published by the TCEQ for the Rancho del Lago project in Blanco County, Texas. My findings are reported in this letter.

The applicant, if permitted, will be required by the terms of the permit to operate, maintain and manage the wastewater system. So it must be determined, by what means will the applicant meet those requirements, including a showing of the fiscal ability to pay for the proper completion of the requirements? This ability is called to question in light of the following:

- We see no demonstration that the applicant possesses either the technical or management expertise to execute the activities necessary to meet the requirements.
- We see no demonstration that the applicant has established a revenue stream and/or has dedicated funds to assure fiscal capability to carry out the requirements.
- Under the provisions of the draft permit, the activities to be funded and addressed include, but are not necessarily limited to:
 - Design of sampling and measurement protocols to assure that samples and measurements would be representative of actual conditions.
 - Sampling and measurements of effluent water conforming to that protocol, assuring the integrity of the samples until they reach a certified lab, and assurance of proper testing by a certified lab, including oversight of quality control.
 - Recording of results of testing and measurements to assure that proper records are created.
 - Safeguarding of all records of testing and measurements, including strip charts and records of calibration and maintenance, copies of all records required by the permit, and records of all data used to complete the application for a period of at least three years from the date of the record or sample, measurement, report or application.
 - Arrangements for management of sludge produced by the treatment process, including such sampling of sludge characteristics as may be required.
 - Records of sludge management, and safeguarding of all such records for a period of at least five years from the date the record was created.

- o Calibration of all flow measuring or recording devices and all totalizing meters for measuring flows, which shall be accurately calibrated by a trained person at plant startup and as often as necessary thereafter to ensure accuracy.
- o Operational control of a complex and inherently unstable treatment plant, including regular, periodic examination of wastewater solids within the plant in order to maintain an appropriate quantity and quality of solids inventory, activities which would require the presence of a licensed operator at least five days per week.
- o Maintenance of the collection, treatment and dispersal systems.
- o Operation of an extensive and complex irrigation system that must properly and accurately distribute water uniformly over 100 acres, including determining the times at which irrigation is not to be practiced due to the antecedent moisture conditions in the soil so as to prevent ponding of effluent or contamination of ground and surface waters and to prevent occurrence of nuisance conditions in the area, and assuring that irrigation is accomplished only when the irrigation area is not in use.
- o Assure that cover crops over the entire irrigation area are well established and maintained throughout the year for wastewater and nutrient uptake by the crop and to prevent pathways for wastewater surfacing.
- o Sampling of soils in the irrigation area, assuring the integrity of the samples until they reach a certified lab, and assurance of proper testing by a certified lab, including oversight of quality control.
- o Remittance of an annual water quality fee.
- o Make specified provisions for expansion of the treatment facilities in a timely manner.
- o Proper planning of sludge management such that 180 days notice of any change in practice can be provided to the TCEQ.

The proposed arrangements for effluent dispersal appear to be flawed and/or unsupported. While comments issued by the Water Quality Assessment Team noted the need for the applicant to characterize the soils in the dispersal area in regard to nutrient content, no requirements to demonstrate the nature and depth of soil in this area has been observed. Soils over much of the Hill Country, where this project is located, are thin and insufficient to support the sort of luxuriant growth that will be required to evapotranspire the water or to assimilate nutrients at the rates proposed to be applied. A picture included in the materials provided to me for review—which purports to show the proposed irrigation area—shows a very rocky surface with sparse plant growth. A report from the Water Quality Assessment Team states that the soil series covering the dispersal area are “very limited” (2 series) or “somewhat limited” (1 series) “to receive wastewater via irrigation” and that the soil depths in these soil series range down to *zero* inches. The team’s report of “Agronomy Recommendations” was apparently made prior to any soil sampling information having been submitted. The soil sample analyses subsequently submitted provide no indication of the general depth of soils over the dispersal site. Thus there has been no demonstration by the applicant that the soils over the entire dispersal area are sufficient for this purpose.

It is purported that the dispersal area is to become a golf course, but at this point that golf course appears to be just a pipe dream, as there is no indication provided of a plan for the golf course or when it may be installed. It is explicitly noted in the application materials that “... the irrigation area will be on the existing vegetated area within the defined spray area, which will be over-seeded with common bermuda.” But simply over-seeding areas such as that shown in the picture referenced above is quite unlikely to result in a uniform stand of Bermuda grass—it definitely would not if soil depths were very shallow. Therefore, it seems imperative to require the applicant

to demonstrate adequate dispersal area presuming that the area remains unimproved, or alternatively to present an explicit plan for improving the soils in the area. In ALL cases, the "Soil Analysis Report" provided by the Extension Service provided a recommended application of 20, 25 or 30 lb/acre of nitrogen for a crop of "bluestem (grazing or hay)". No plans have been presented by the applicant to indicate that he is in any way prepared to grow even that crop, and it is noted that the area shown in the picture referred to above could not even be cultivated without improvement, yet the land application analysis presumes that an application rate of 40 lb/acre of nitrogen would be applied, which is purported to be supported if the crop were "turf fairways, athletic fields, etc." Again, the area in the picture referred to above could not be cropped in this manner without considerable improvement.

The land application analysis for nitrogen presumes that the level of total nitrogen in the treatment system effluent would be 10 mg/L. The level of total nitrogen typically observed in domestic wastewater is 40-60 mg/L. Available information indicates that levels tend toward the top end of that range when water-conserving fixtures are used, which legally are all that may be installed in new homes in Texas at present. Unless the treatment system is designed and operated to explicitly remove nitrogen, it should not be expected that effluent total nitrogen concentration would be much below influent concentration. There is no apparent nitrogen reduction capability in the treatment process proposed in the materials I have reviewed. Therefore, it is highly unrealistic to execute the land application analysis with a presumption that the water being dispersed has a concentration of 10 mg/L for total nitrogen. With the treatment process proposed, an effluent total nitrogen concentration of at least 40 mg/L should be presumed.

The "Nitrogen Balance" provided by the applicant in an exhibit labeled "Table 3" appears to contain errors. The application rate in January and December presumed in that table is the same as that applied in July and August; that is, it is presumed that the application rate would be "flat" throughout the year. The presumed application rate is 4,000 gallons/acre/day, which is 0.092 gallons/sq. ft./day. According to the "Monthly Water Balance" provided by the applicant in an exhibit labeled "Table 1", the evapotranspiration in January would be 1.35 inches and in December it would be 1.08 inches, which yield rates of 0.027 and 0.022 gallons/sq. ft./day, respectively. This implies that if the application rate is indeed "flat" throughout the year, the majority of the effluent applied in the winter months would leach on through the soil, otherwise it would pond and run off, which would violate the permit restrictions on system operational standards. And that in turn implies that most of the applied nitrogen would leach on through the soil rather than being taken up by the plants (noting that some would be lost to in-soil denitrification, the estimate offered in the EPA land application manual for surface irrigation of secondary effluent being about 20%). It is noted in Table 3 that the applied nitrogen is listed as an "excess" in the five months with the lowest evapotranspiration potential. In Table 1, however, it is indicated that the effluent application rate would not be "flat", that very little would be applied in January and none would be applied in December, with applications in the summer being higher, meaning the nitrogen balance analysis is fundamentally wrong. Finally, note that the calculations of applied nitrogen in Table 3 are in error.

It is suggested that the applicant should be required to provide a nitrogen analysis which represents the realities of the actual situation. This would include presuming the nitrogen uptake of the existing plant cover or the plant cover for which an explicit plan to install is offered, a presumption of at least 40 mg/L total nitrogen concentration in the system effluent, and monthly application rates that match the presumptions in the "Monthly Water Balance" calculations. In any case, the

applicant should be required to submit evidence that the proposed dispersal area has soils adequate to support plants of a quality and at a density to provide the nitrogen uptake that is presumed.

If the applicant wishes to claim that the treatment system would indeed produce an effluent that is partially denitrified effluent—that is, an effluent that has a significantly lower concentration than 40 mg/L of total nitrogen—then TCEQ should include total nitrogen in the effluent set, at the concentration claimed in the land application analysis, to assure that the presumed concentration is indeed attained on an on-going basis. If for some reason TCEQ feels that it cannot do this under its rules (in which case it should be expected TCEQ would provide a detailed explanation), TCEQ should require a detailed demonstration and justification that the treatment process proposed would be expected to consistently and reliably produce the total nitrogen concentration presumed in the land application analysis, including operating data from the exact type of treatment plant proposed. The draft permit does not include the former, and TCEQ does not appear to have required the latter. The end result is that the public is offered absolutely no assurance that nitrogen pollution would not issue from the proposed land application process.

I am informed that there is a major spring within several hundred feet of the dispersal area boundary. This would seem to imply the possibility that nitrogen leached from the dispersal area would appear in the water issuing from this spring. That may degrade the quality of surface waters. TCEQ should require the applicant to provide an explicit demonstration that nitrogen would not leach at rates above the background level of total nitrogen presently in the spring flow and/or that the water leached from the dispersal area would not feed this spring.

In regard to the monthly water balance, it is noted that the contribution of rainfall to the storage reservoir was not accounted for in the calculations in Table 1. With all units in inches, the rainfall depth should be added as an input to the reservoir in each month. This will impact on the "Storage Volume Requirements" provided by the applicant in an exhibit labeled "Table 2". Also, the storage analysis in Table 2 presumes that "flat" application rate over the annual cycle rather than the actual expected applications in each month. Evaluating the water balance and storage calculations is further complicated by there being other tables in the materials provided to me that have different values for the primary inputs. It must be determined which are the "correct" calculations, then their accuracy should be reviewed for such errors as noted here. This may impact upon the area required for dispersal and/or upon the volume of storage required. From the information available, it appears that the exhibits I have referred to in the above paragraphs are the "corrected" tables and thus the information upon which the draft permit was prepared. This would imply that TCEQ has not reviewed this information adequately, and thus TCEQ has not properly determined if the dispersal area and/or the storage reservoir are adequately sized.

In any case, the materials I have reviewed indicate that the proposed dispersal area may not all be available. The applicant states in those materials, "Spray will be limited to areas outside of any natural flow paths." As I have not seen detailed topo of the area in question, I cannot discern what impact this may have on the area that would actually be available for dispersal, but it appears that the main stem of Kentucky Branch of the Blanco River flows through the area in question. This calls to question the actual amount of area that would be available for dispersal. Further, it is noted in comments by TCEQ that areas with slopes in excess of 12% may not be used as dispersal area and that there appears to be areas with slopes >12% within the area specified by the applicant as the dispersal area. The applicant states in Domestic Worksheet 3.1 that the maximum land slope in the proposed dispersal area is 15%. Given the application rates proposed and the nature of the

dispersal area as represented by the picture referred to above, it is called to question if areas with any significant amount of slope would not produce runoff. That, of course, would be highly dependent on application rates and the irrigation cycle.

This brings up the issue of irrigation system design and operation. What is the specific hardware that would be used to execute the irrigation process? How will it be designed and controlled to provide uniform coverage and uniform daily distribution over the entire dispersal area at the proper application rates? How would those application rates be determined so that runoff or pooling would be precluded? In TCEQ comments, the only factor considered was saturated hydraulic conductivity of the soils—which itself presumed the presence of a significant depth of soil, and that has not been demonstrated. This says nothing about allowable application rates, since the ability of the soil to infiltrate is not the same as the saturated hydraulic conductivity. Further, in calculating the application rate, TCEQ presumed the annual average application rate, but since effluent would be stored during winter months and application volume would increase in the summer, the application rate would have to increase and/or the application time would have to increase. That again impacts on the required irrigation cycles, about which we have no information. Therefore, it appears that the applicant has not demonstrated that he can indeed apply the effluent to the area proposed for dispersal without causing runoff or pooling of effluent.

In sum, while what appears to be a comment by TCEQ states, “The water balance prepared by TCEQ staff confirms that an effluent application rate of 4.48 acre-feet per year per acre irrigated is possible at the proposed site and the storage calculations confirm that 110 days of storage is adequate for the proposed facility”, I cannot discern from the material I have been able to review that this is indeed the case. The questions noted above must be addressed and appropriate analyses conducted before this can be determined.

Regarding sludge management, the analysis provided by the applicant states that, at full design flow, 1,598 gallons of sludge would be produced per day and that sludge would be removed at 63-day intervals, implying that the total amount of sludge hauled at each removal would be $63 \times 1598 = 100,674$ gallons. A 7,000-gallon truck is typically used by companies that haul sludge from plants like the one proposed, implying that each removal would entail $100,674/7,000 = 14.4$ truckloads. That means that the contents of the sludge digester would be “disturbed” 15 times during each removal event. This implies a significant odor potential. There is nothing apparent in the material provided by the applicant that describes how odors would be controlled and a nuisance would be prevented, a nuisance that would occur about once every two months at full design flow. This is anything but a trivial problem. It is called to question how the sludge management process would be managed so as to preclude the problem.

There is no discussion provided on the nature of the collection system, and the consequent level of vulnerability that it represents. Conventional collection mains WILL leak, manholes WILL overflow, lift stations WILL fail. This raises the following questions:

- What are the design features of the system that may minimize any of this?
- What is the level of management that would be applied to minimize any of this?
- What analysis of these vulnerabilities has been conducted, and what did this imply for the overall ability of the system to perform “as advertised”?

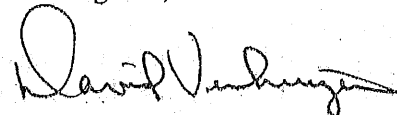
The application clearly defines the function of the dispersal system to be "disposal", which implies that the point of the management system is to control a nuisance rather than to manage a resource. While it is purported that the dispersal area would eventually be a golf course, the irrigation of which could be considered a beneficial reuse, there is no indication that this would actually happen. It is suggested that TCEQ can only judge this application on the basis of what is apparent that WILL happen, and in this case, what will happen is that the effluent would be "land-dumped" for the sole purpose of getting rid of something that is perceived to be a nuisance. The proposed system would waste up to 146 million gallons of water per year. Given the long-term water supply realities of the region, it would seem that TCEQ has an interest in having the applicant consider alternative systems that would more effectively conserve a valuable natural resource, rather than treat it as a nuisance to be disposed of.

I also have questions about the ability of the proposed treatment process to operate so as to consistently and reliably produce any given level of effluent in the face of diurnal flow variations and during the period when considerably less than full design flow is being received. However, the materials that I have reviewed do not provide enough details on the process to formulate specific questions. There is no operating theory for activated sludge that does not assume steady state flow. Since this system would not receive steady state flow, there is no theoretical basis for expecting any specific level of performance. Understand that the TCEQ design standards are predicated essentially on "static" performance, and many, many plants that are designed to those standards have exhibited very poor performance in the field when operating under real-world conditions. Therefore, any realistic consideration of the level of hazard represented by such a plant, even if competently operated (which in this case is open to question as the applicant has demonstrated no capability to manage this proposed wastewater system), must examine actual operating experience of *this* proposed process under similar duty to which it would be subjected in this case. I would suggest that the applicant should be required to submit such operating history.


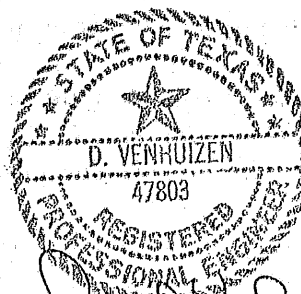
Finally, the applicant does not have a wastewater CCN for the area to be served by the proposed system. According to information provided by TCEQ, the application for a "sewer CCN" is contested and has been in process for an unusually long time, which implies that there is no assurance that a CCN can be obtained. Unless that CCN is "awarded" to Rancho del Lago, Inc., this entire permit application is moot.

Please do not hesitate to call if you have any questions about any aspect of these observations and comments.

Best regards,



David Venhuizen, P.E.


3/2/06